

FIELD SPECTROSCOPY OBSERVATIONS OF THE GRAVITATIONAL LENSES H1413+117 AND Q2237+030. PRELIMINARY RESULTS

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The long-term observational programme for investigation of quasar microlensing spectral effects was devised and now is implemented at the Special Astrophysics Observatory (Russia, N.Arkhyts) and at the Astronomical Observatory of Kiev University (Ukraine, Kiev). The main goal of this programme is to study the fine quasar structure. For this purpose the observations of the gravitational lenses H1413+117 and Q2237+030 are carried out with the 6m SAO telescope in the integral field spectroscopy mode. The suitable equipment for such observations - the Multi-Pupil Field Spectrograph - was designed and built in SAO. From February 1993 several observations of each of these objects were performed. Here we present the preliminary results of the Clover Leaf observations on April 23/24, 1993. The quasar images are separated by angles nearly 1 arcsec. At seeing of the order of 1.5 arcsec the separation of the individual quasar image spectra was a problem. For this purpose a special procedure is developed. This procedure is based on the maximum likelihood hypothesis to restore a simple 4-point source picture plus the background. The effect of light scattering for a point source was simulated by means of observations of a reference star. Statistical properties of the radiation flux in question were studied by using the data of photon registration each 40 msec. The individual spectra of quasar images were obtained. The internal relative errors of the spectra separation procedure vary from 7 to 12% depending on wavelength. The spectra of quasar images 1, 2, 4 are not actually distorted. On the contrary, in the spectrum of the third image the profile of the emission line CIV differs considerably from the profile of the same line in the "undisturbed" quasar spectrum. Fig. 1a,b show the spectra of the 1st and the 3rd images.

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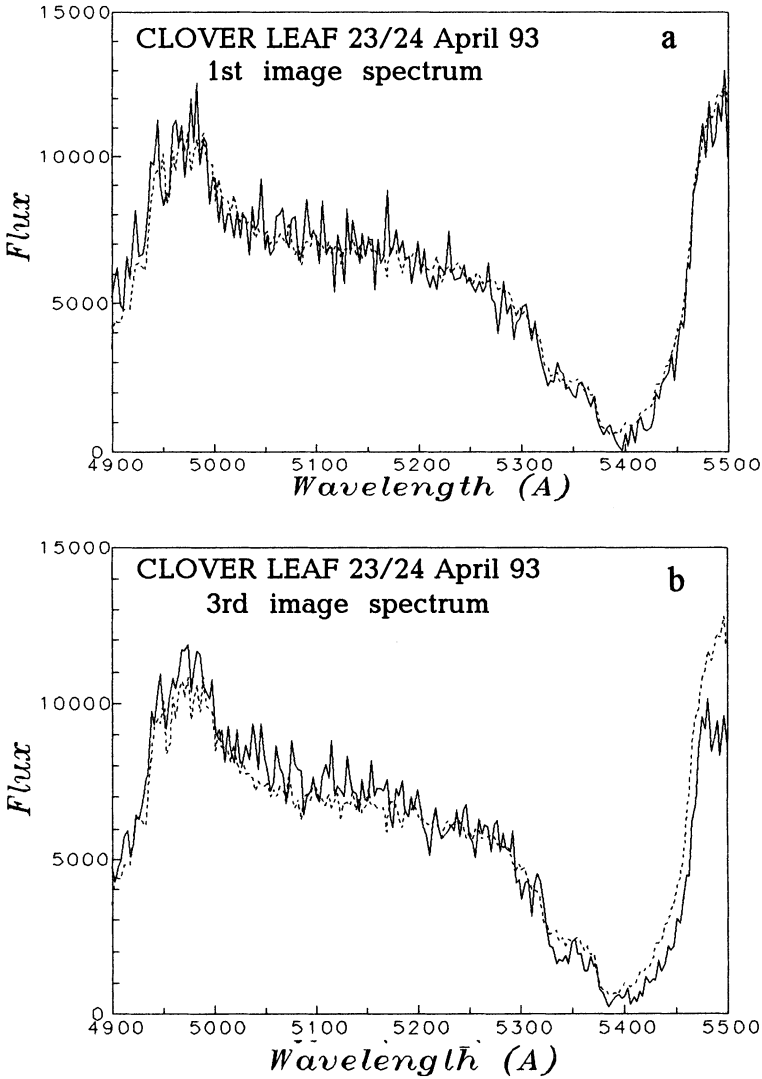


Fig.1. The normalized spectra of the 1st and the 3rd quasar images as it is obtained by use of the separation algorithm. Dashed lines depicts an "undisturbed" quasar spectrum that is given by integration over total observation field minus background.